

Felix Buechi *et al.*
Appl. No.: 10/608,088

Amendments to the Drawings:

The attached three sheets of drawings include changes to Figures 1 – 4. These sheets replace the original sheets including Figures 1 – 4. The drawings have been amended as follows

Figure 1 has been labeled as “Prior Art.” Further, in Figure 1, reference numerals 20 and 21 have been deleted.

Figure 2 has been labeled as “Prior Art.” Further, reference numerals 11, 20 and 21 have been deleted. Lead lines and corresponding reference numerals have been clarified. German word “Luft” has been replaced by “Air.”

Figure 3 has been amended to label arrows as 36, 41 to avoid double use of numerals 32, 33.

Figure 4 has been amended to clarify the lead lines of numerals 33a and 33b.

Attachment: Replacement Sheets
Annotated Sheets Showing Changes

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REMARKS/ARGUMENTS

Claim Status

Currently, Claims 1 – 23 are pending.

Objections to the Drawings

The Examiner objects to the drawings under 37 C.F.R. §1.84(p)(5) for showing reference numerals not mentioned in the description, and under 37 C.F.R. §1.84(p)(4) for improperly using reference numerals for different items. Further, the Examiner requests labeling Figures 1 and 2 as Prior Art.

The drawings have been amended as follows

In Figure 1, reference numerals 20 and 21 have been deleted.

In Figure 2, reference numerals 11, 20 and 21 have been deleted. Lead lines and corresponding reference numerals have been clarified. German word "Luft" has been replaced by "Air."

In Figure 3, arrows at the input and output of channel 7a have been labeled as 36, 41 to avoid double use of numerals 32, 33.

Figure 4 has been amended to clarify the lead lines of numerals 33a and 33b.

Further, Figures 1 and 2 have been labeled as "Prior Art."

By these amendments, the drawings are believed to comply with 37 C.F.R. §1.84(p)(4) and (5). No new matter has been added. Applicants respectfully request the Examiner to withdraw the objections to the drawings.

Claim Rejections – 35 U.S.C. §112

The Examiner rejects Claims 12 and 13 under 35 U.S.C. §112, 2nd paragraph, as being indefinite alleging that the term "substantially similar materials" in Claim 12 is a relative term which renders the claim unclear.

By this Amendment, Claim 12 has been amended to define further that same materials are used for the electrolyte membrane and the humidity pervious membrane. Applicants respectfully request the Examiner to withdraw the rejections under 35 U.S.C. §112, 2nd paragraph.

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Claim Rejections – 35 U.S.C. §102

The Examiner rejects Claims 1-23 under 35 U.S.C. §102(b) as being anticipated by Vanderborgh (U.S. Patent No. 4,973,530). Hence, the Examiner asserts that Vanderborgh discloses each and every limitation recited in Claims 1-23. Applicants traverse for the reasons set forth hereinafter.

Claim 1 as amended defines a method of providing humidity to an electrolyte membrane of a fuel cell, wherein the membrane runs between a cell anode area and a cell cathode area. The method includes extracting humidity from fluid flowing from one of the anode and cathode areas, and charging fluid flowing into the one of the anode and cathode areas with the humidity, wherein flow channels are separated from each other in a fluid-tight manner. Independent Claim 10, which is directed to a fuel cell, has been amended accordingly.

In this regard, the present description explains that the claimed method and system are advantageous because humidity is removed from the fluid flow expelled from the cathode area and is added to the fluid flow which flows into the cathode area so that a simple humidity circuit is produced which can be achieved without any greater construction effort and in particular does not require any further external gas or water circuits, as is the case in the above-cited prior art. (Page 3, lines 21 – 26.) Further, excess humidity can be expelled to the outside with the outflowing fluid. (Page 3, lines 28 – 29.) The description explains further that not only is the drop in pressure the same for each fuel cell in the fuel cell stack on the cathode side over the inlet in front of and the outlet after the humidity exchanger, but the volume flow or mass flow of fuels is also the same, so that the production of current is the same for each of the fuel cells in the stack. (Page 4, lines 9 – 12.)

Vanderborgh, which is already discussed in the present description on page 2, line 27 to page 3, line 7, does not disclose or suggest such a humidity circuit as produced by the method of Claim 1 as amended. Instead, Vanderborgh teaches to regulate the humidity content in a fuel cell membrane by continuous addition of externally supplied water into the anode area and by continuous removal of humidity on the cathode side.

More particularly, Fig. 5 shows a fuel cell 80 that has a humidification-cooling volume 97 and a water transport volume 117. Water flows into the humidification-

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cooling volume 97 through port 106 and exits through port 107. (Col. 8, lines 53 – 55.) For the addition of water a water transport membrane 109 is arranged next to the membrane 102 of the fuel cell and the channel for the hydrogen is arranged in such an alternating pattern that it is routed back and forth in a zigzag fashion first via the membrane 102, then via the water-transport membrane 109, until both membranes are fully covered and the residual hydrogen can be expelled to the outside. A water removal membrane 108 removes humidity from the cathode area with the same zigzag routing arrangement. Dry gas routed over the water removal membrane 108 absorbs the humidity to be discharged, and expels it to the outside.

In view of the foregoing, Applicants respectfully submit that Vanderborgh does not disclose or suggest a method of providing humidity to an electrolyte membrane of a fuel cell that includes extracting humidity from fluid flowing from one of the anode and cathode areas, and charging fluid flowing into the one of the anode and cathode areas with the humidity, wherein flow channels are separated from each other in a gas-tight manner. Therefore, Vanderborgh does not disclose or suggest each and every limitation recited in Claim 1, as amended, and, consequently, does not anticipate the subject matter of amended Claim 1. Applicants respectfully request the Examiner to reconsider the rejections under 35 U.S.C. § 102(b) and to pass Claim 1, as amended, to allowance.

Claims 2 – 9 depend from Claim 1, as amended. For this reason and because of the additional features recited in the dependent claims, Applicants respectfully submit that Vanderborgh does not anticipate Claims 2 – 9. Applicants respectfully request the Examiner to pass Claims 2 – 9 to allowance.

As to independent Claim 10, as amended, and Claims 11 – 23, which depend from Claim 10, the above reasons regarding Claims 1 – 9 are repeated herewith. For these reasons, Applicants respectfully request the Examiner to reconsider the rejections under 35 U.S.C. § 102(b) and to pass Claims 10 – 23 to allowance.

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Conclusion

The present response is intended to correspond with the Revised Amendment Format. Should any part of the present response not be in full compliance with the requirements of the Revised Amendment Format, the Examiner is asked to contact the undersigned for immediate correction.

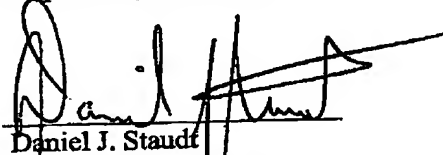
For the above reasons, Applicants respectfully submit that the application is in condition for allowance, and such allowance is herewith respectfully requested.

Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicants' attorney in order to resolve such issues promptly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 502464 referencing attorney docket number 2003P09049US.

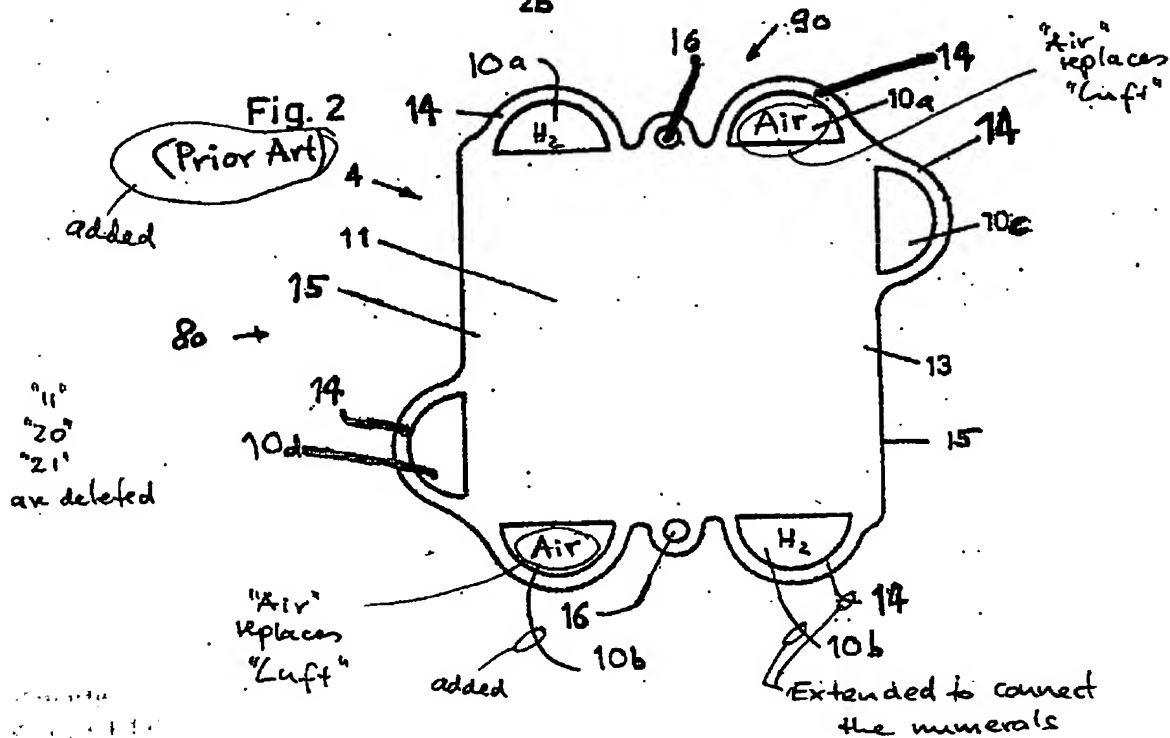
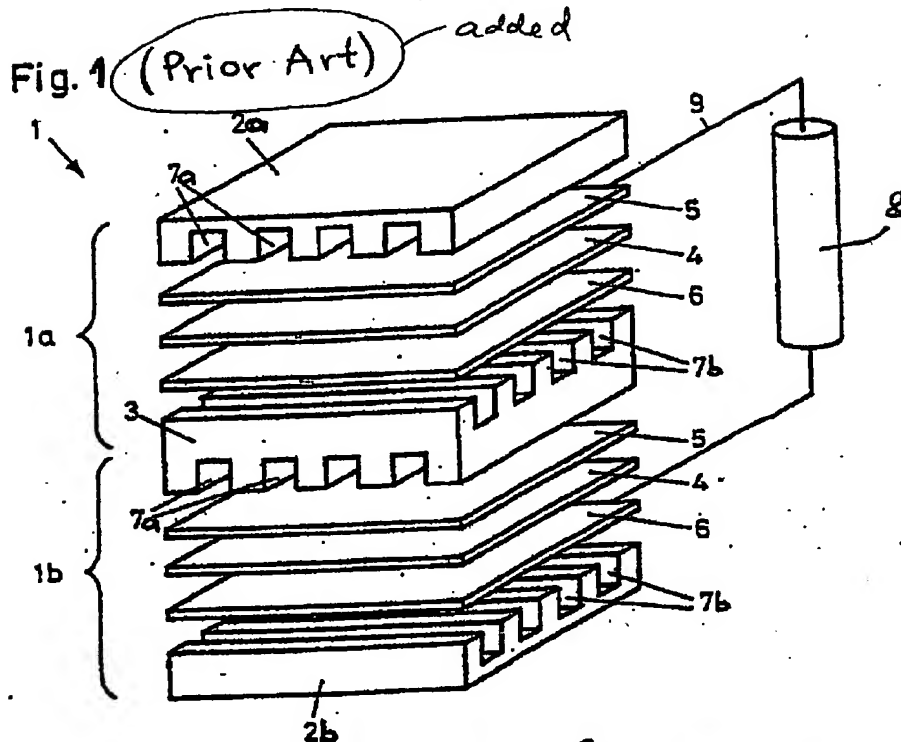
Date: 5/2/06

Respectfully submitted,



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Reply to Office action of February 2, 2006
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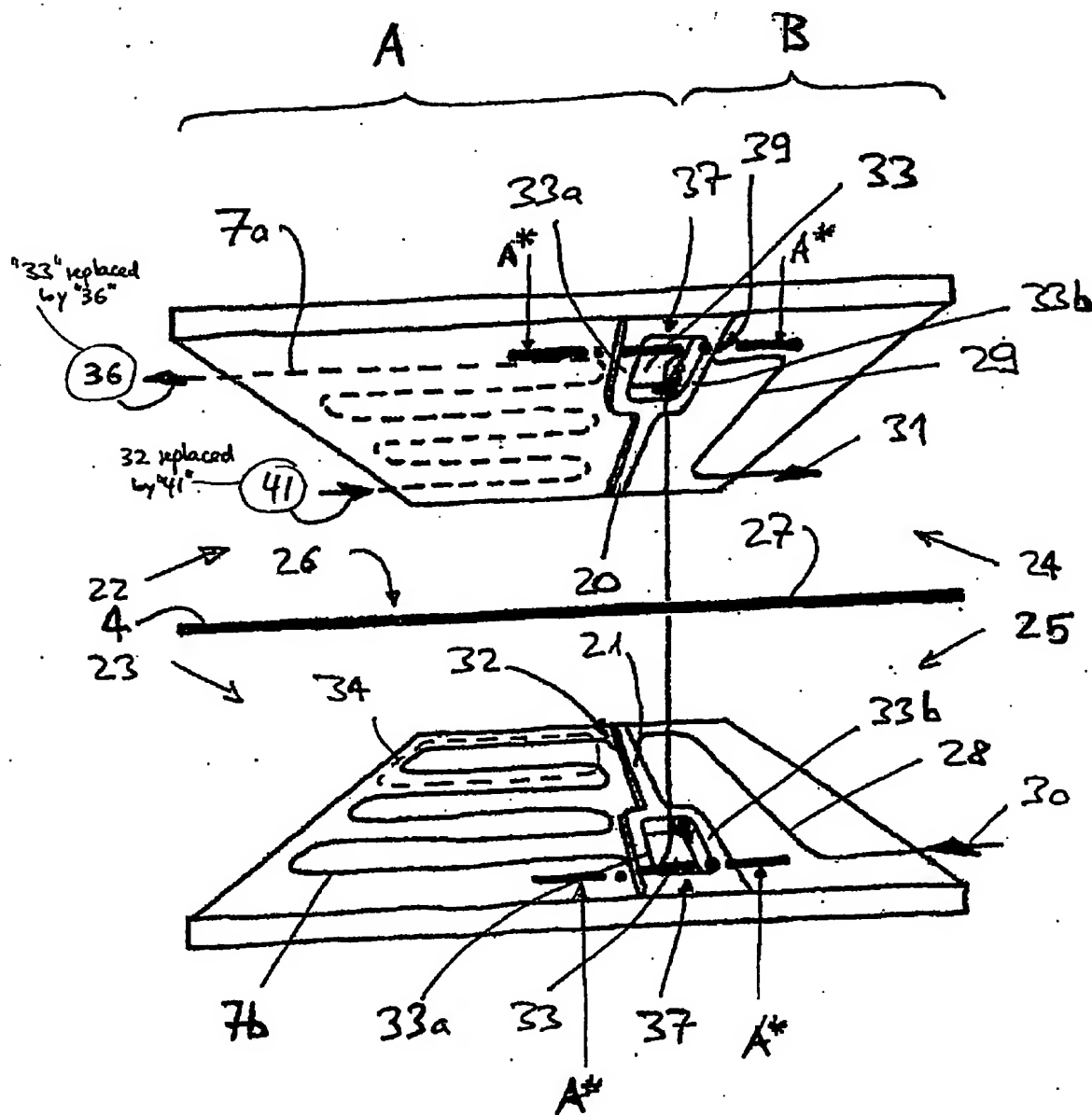


Fig 3

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